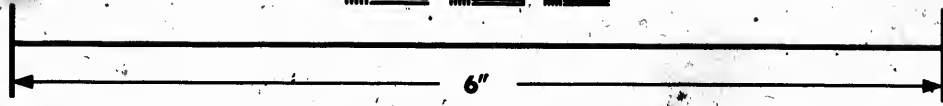
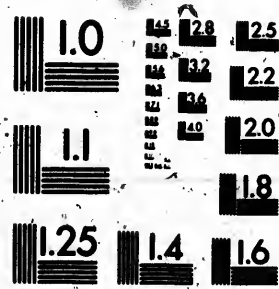


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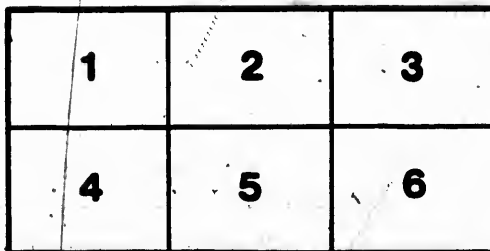
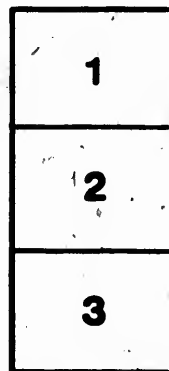
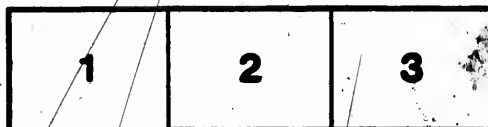
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Great Western Railway.

Lumber Insects

CONDITIONS of Contract for ~~Coal~~ Waggon, with Hopper Bottoms, for 4 feet 8 1/2 inches Gauge.

SPECIFICATION.

GENERAL DIMENSIONS.

	ft. in.
Length over the Body and Frame	13 0 16 0
Width over the Body	7 4
Depth of the Body above the wood side frames, exclusive of the iron cap	9 0 8 9
Width between the Iron Side Frames	6 7
Width between the Axle Guards	6 8 1/2
Width between the Wood Side Frames	6 4
Width from centre to centre of Journals of Axles, and Bearing Springs	6 4
Width between centres of Buffers	5 9
Width between centres of Side Chains	1 1
Length of opening of the Hopper, in the clear	4 9
Width of do. do. do.	4 0
Height of the centres of the Buffers, Drag and Side Chains, from Rail	3 3
Length of Bearing Springs from centre to centre of Bearing Shoe	3 0
Diameter of Wheels in centre of tread	3 6
Distance of Wheels apart, centres	8 10

DESCRIPTION AND MODE OF FRAMING.

All the wood framing and ~~connections~~ are to be of English Oak; the sides and ends are to be of Red Pine; the bottom inclined boards and hopper flaps are to be of Elm of the best quality of their kind respectively, dry, sound, and free from knots or shakes.

The iron side frames are to be 8 inches deep, by 4 1/2 inches wide, framed between the end frames.

~~The end side bars are to be 10 inches deep by 3 inches thick, tenoned into the end frames.~~

The End Frames are to be 12 inches deep by 4 1/2 inches thick, rebated on the top outer edge 2 inches deep by 1 1/2 inches on, for the lower end boards, and morticed on to the sole bars and diagonals, and secured by strap bolts outside the iron sides, and by eight wrought iron knees, 9 inches wide, two at each corner, and bolts, inside the framing.

The Transverse Bearers are to be 10 inches deep by 4 1/2 inches thick, tenoned into the sole bars, secured ~~thereby~~ by two 1/2 inch "bed bolts" at each end.

The Diagonals are to be 12 inches deep at the end frames by 1 1/2 inches deep at the transverse bearers, by 3 inches thick, tenoned into each, and secured to the end frames by the above described eight wrought iron knees and bolts, and to the transverse bearers by two wrought iron knees, one at each bearer, 6 inches wide each.

The Axle Guards are to be clean, sound, and well-made forgings, of equal thickness throughout, (except the projecting shoulder under the iron side,) and made perfectly straight and true between the horns, and fixed equidistant from the centre of the drag bar, and at right angles to the plane of the frame, vertically and horizontally, bolted through the iron and oak side frame, with cup-headed, square-necked bolts, ~~square-necked bolts.~~

The horns are to be 7 1/2 inches between for admitting and confining the Axle Boxes, the ends of the horns to be braced with straps of iron, 2 inches wide by 3/4 inches thick, fastened with 1/2 inch square necked bolts.

The draw bars, spring loops, coupling chains, hooks, and face plates are to be strong and well and squarely forged, filed and fitted, with a cast iron stop ~~and screwed on the angles of the square neck of the draw bar, at a distance of 3 inches from the end frames.~~

The side coupling chains to have long eye-bolts to reach through and be screwed inside the transverse bearers, each out to have a washer ~~1/2 inches square by 1/2 inch thick~~, the bolts to be cut off flush, with the nuts, the nuts to be well rounded on the outer face. Two hauling staples to be fixed to each waggon, one on each side, at alternate corners.

The hopper flaps are to be in two equal parts hinged to the transverse bearers, and balanced by cast iron weights, on levers forged in one piece, with the hinges. The hinges are to be 3 inches wide by 3/4 inch thick at the point, and 3/4 inch thick at the eye; the points of the hinges of one flap, to be formed so as to lap under and support the hinges of the other flap.

The hinge bolt to be 1 1/2 inches diameter, hung to the transverse bearers by strong shouldered eye bolts passing through them, and screwed upon the top.

The flaps to be further strengthened by 3 by 3/4 inch plates in the centre, lapping each other where they meet.

The fastenings of the flaps to be soundly and well forged catch levers with hinged sliding stay, and fastening pin.

The Bearing spring shoes to be clean and well made castings, with flanges to keep the spring in place, and fastened to the under side of the oak sole bar with large countersunk screws.

The Sides and Ends of the Body to be grooved, and tongued with iron and beaded at the joints, the sides to have three 3/4 inch bolts and the ends two 3/4 inch bolts through them, countersunk into the iron cap and screwed underneath the flange of the iron side Frame.

The Cap Plate to be flat round 2 by 3/4 inch iron welded at the corners in a strong and substantial manner, and fastened with large countersunk screws between the bolts about 9 inches apart.

The Corners of the Body to be bound by iron corner plates lapping 2 inches each way, by 1/2 inch thick the whole depth of the boarding, and fastened to each board by two 3/4 inch bolts.

Each side to be supported by two strong wrought iron brackets ~~2 and 1 inches wide by 3/4 inch thick, rivetted at the bottom to the top flange of the iron side Frame, and turned down 1 inch inside of the same, and bolted through each board and inside face plates 2 1/2 inches by 3/4 inch, with one 3/4 inch bolt.~~

The Ends to be each supported by two oak stanchions ~~riveted to the End Frame by bolt staples and bolts, screwed upon washers inside. The boards to be bolted to the stanchions by one bolt each.~~

The inclination of the Hopper Bottom to begin at 8 inches from the top, at the ends, and 2 feet 1 inch from the top at the sides. The end inclined boards to be supported at the top by a level edged bar 6 inches deep by 2 inches thick, at the lower end on the transverse bearers, and in the middle by a bar on flat 9 1/2 inches wide by 2 inches thick, carried at the ends by two props 5 1/2 inches wide, by 4 inches thick, bolted through to the side boards, by two 3/4 inch bolts, and screwed inside.

The Sides of the Body to be tied transversely by two 3/4 inch through bolts under the inclined hopper boards at each end.

The inclined Boards at the sides to be supported by triangular shaped oak blocks, and in the centre by a triangular iron bracket under the flap fasteners, all of them are to be securely bolted to the Side Frames.

"Address Card Holders" to be screwed to the lower board in the centre on each side.

The Break is to be made to work blocks on two wheels with long lever, with a ~~rod~~ ~~through it to receive the coupling links of the black hanger levers.~~ The whole to be made of the best scrap iron and equal in finish to black engine work, and in accordance with the drawing. The blocks to be of Willow or Poplar cut to the proper template, and bolted to the hangers with 3/4 inch bolts with sunk nuts.

The Buffers are to be of an approved construction of the general size and outline shown, with ~~wrought rods and of about eight pounds value per set of four Buffers.~~ *a block of wood hoops with iron bands and bolts*

The Draw Springs to be of the description shewn on the drawing.

The Bearing Springs are to be 3 feet long from centre to centre of the point of bearing on the shoe, and 3 feet $\frac{1}{2}$ inches extreme length, the point of the top plate is to be thickened and rounded where it bears on the shoe, the back plate is to be 3 inches by $\frac{1}{2}$ inch, and the other plates 3 inches by $\frac{1}{4}$ inch. All to be made from the best quality of cast spring steel, manufactured from Swedish iron, and with such camber as with the strain of the empty waggon shall bring them to the form shown on the drawing. The whole of the Springs to be finished in the most workmanlike manner, and proved to the straight under a testing machine.

The Axle Boxes are to be clean, sound, strong and well made Castings of approved pattern, with "Vander's Patent Metal Bearings," carefully fitted, bedded, bored, and scraped out to fit the ~~double~~ ^{parallel} coned Journals.

The Grease Box Covers are to be well jointed in the hinges and closely fitted on the Boxes; each cover is to have a spring to keep it from rattling. The back of the boxes is to be fitted with "Normanvilles" Patent Collar Washers, the grooves for the collars, and the Axle Guard Horns are to be well and truly formed, and the holes for the spring clip bolts to be runned out true to one uniform diameter.

The Clip Bolts and Plates are to be well and neatly made and fitted, and of approved patterns.

Packings of hardwood shaped as shown, for the top of the springs, are to be put between the clip bolts and the springs, and the nuts screwed tight to keep the whole together.

THE WHEELS AND AXLES.

The Axles are to be 3 feet $\frac{1}{2}$ inches long from centre to centre of the journals, by 5 inches diameter in the nave, reduced with a gradual hollow taper to 4 $\frac{1}{2}$ inches diameter in the centre between the wheels.

The Journals are to be 6 $\frac{1}{2}$ inches in length, of the double coned form, 3 inches in diameter in the centre, and 2 inches in diameter at the shoulders. The Cones are to be turned perfectly true, of equal angles and diameters, and the axle to an uniform gauge of 5 inches diameter to fill the naves, and chased to receive a $\frac{1}{2}$ inch by $\frac{1}{2}$ steel key.

The Wheels are to be of solid wrought iron 3 feet 6 inches in diameter at the centre of the tread.

The Spokes are to be 8 in number 2 $\frac{1}{2}$ inches wide by 1 $\frac{1}{2}$ inch thick inside the rim, tapering to 3 $\frac{1}{2}$ inches wide by 1 $\frac{1}{2}$ inch thick, 3 $\frac{1}{2}$ inches from, and 2 inches thick at, the nave.

The Rim is to be 1 inch in thickness when finished, 3 $\frac{1}{2}$ inches in width on the dove-tailed periphery and 2 $\frac{1}{2}$ inches wide inside the dove-tail, and to be welded solid throughout.

The Nave is to be 6 $\frac{1}{2}$ inches in length on the Axle, by 8 $\frac{1}{2}$ inches diameter on the face, and 9 $\frac{1}{2}$ inches diameter in the centre, soundly welded together, clean and well formed at the Spokes, bored out to one uniform gauge of 5 inches diameter to fit the Axle; slotted opposite the end of a spoke to receive the steel key, faced on both ends, and turned to shape in the lathe up to the shoulders of the spokes.

The Tyres are to be 5 inches wide by 1 $\frac{1}{2}$ inches thick in the centre of the tread when finished. They are to be soundly welded and well blocked or rolled, and made true laterally on a side face plate, then turned and bored out to the proper section, as shown by the drawings, and to an exact gauge or diameter, so as to fit any of the wheels (which are also to be turned to one uniform gauge) and shrunk on and secured thereto by "Gibson's Patent Annular Key Fastening." When finished, each wheel shall balance accurately—that is to say, the centre of gravity shall be exactly in the centre of the wheel, and such measures shall be adopted to test this as the Engineer may direct.

The Axles shall be either of the Patent Shaft and Axletree Company's, or Thorneycroft and Company's.

The Tyres shall be either Bowling Company's, Patent Shaft and Axletree Company's, or Thorneycroft's Charcoal.

The Wheels are to be keyed on the Axles to a standard gauge, equidistant from the centres of the journals, and 4 feet $\frac{1}{2}$ inches in the clear of the inside edges of the tyres, and otherwise to fit exactly the standard gauge. The whole to be made according to the drawing, and to the satisfaction of the Engineer.

The Tyres, Axles, and forged Skeletons, are to be of the best materials of their respective kinds. The Wheels, when keyed on, are to be perfectly concentric with, and equidistant from the journals, and true on both edges. All Wheels, Tyres or Axles proving defective in workmanship or materials, after

due trial, will be rejected, and are to be replaced at the expense of the manufacturer. All necessary gauges are to be provided by him, and they must be approved before being used. None of the work is to be painted until examined by the Engineer or his Inspector, and approved by the Engineer.

PAINING.

The whole of the wood work outside and underneath to be painted with three coats of oil colour, of a brown shade of approved description.

All the iron work, including the wheels and axles, to be painted with two coats of black.

The Company's Initials, the Tare of the Waggon, the load to be carried by it, and its number, to be painted on each side, in large letters and figures, to correspond with the rest of the Company's Waggon.

GENERALLY.

The whole of the materials and workmanship shall be of the best description of their respective kinds, and in strict accordance with the form, arrangement and intent of the drawings and Specification.

The Manufacturer is immediately to prepare a complete set of full sized working drawings of the several detail parts for the Engineer to examine, and if approved, to sign, and duplicate copies of the same to be retained by the Engineer, and should any deviation from such drawings be discovered in the articles when executed, such articles will be rejected, unless such deviation shall have been previously sanctioned by the Engineer in writing.

The Manufacturer is to pay all Patent Right and Royalties which may be due to any Patentee or other persons, so as to relieve the Company from all claims in respect of any costs beyond the contract price.

No advantage is to be taken of any omission of detail in this Specification, or in the drawings, as full explanation will be given should any part not be sufficiently described, shown, or understood.

COMPLETION AND CONDITIONS.

The parties tendering are to fill in the numbers of the first, and subsequent deliveries, and the times at which they will undertake to complete, and deliver them respectively.

The whole of the work embraced by this Contract is to be completed, and the Waggon delivered, on or before, the _____ day of _____ 1847. The first delivery of _____ to be made on, or before the _____ day of _____ and the remainder in equal numbers per week afterwards, until the completion. And should the Manufacturer fail so to deliver all the Waggon by such date, he shall allow to the Company, by way of diminution in price, a sum per week, equal to one half per cent, on the value of the Waggon in arrear, and for each week after such _____ day of _____ 1847, until the Waggon shall be delivered.

The Tender shall state the price per Waggon, delivered free on the Company's (Narrow Gauge) Rails under each description of Axles, and Tyres, such price to be the purchase price at the times of delivery, if the Directors shall so elect, and it shall also be the basis for an agreement, to let the Waggon on hire for a fixed term of years, with the option to the Company of purchase at the expiration of any year during such term, after having given 6 month's notice to the Contractor, at a fixed price each, for each year.

The Tender shall also state the Amount of Yearly Rent for each Waggon, under the separate heads, ~~including~~ all repairs; at which the Contractor will agree to let them to the Company.

The Waggon to become the property of the Company at the expiration of the agreed term, at, and on payment of the price fixed for each, for the last year of the said term.

GREAT WESTERN RAILWAY.

TENDER FOR COAL WAGGONS WITH HOPPER BOTTOMS.

To the Directors of the Great Western Railway Company,

GENTLEMEN,

I, or We, _____ offer to supply you with Coal Waggon with Hopper Bottoms, manufactured and delivered in accordance with the foregoing Specification, the drawings therein referred to, and Stipulations contained in the "Conditions of Contract," delivered free on the Company's ~~Narrow~~ Gauge Rails, in the numbers, and on or before the dates, entered by _____ in the foregoing Conditions, viz.—The first delivery of _____ Waggon, to be made on, or before the _____ day of _____ 1857, and the remainder in equal numbers per week afterwards, until the completion, on or before _____ day of _____ 1857, with either of the following description of Axles, and Tyres, at the following prices per Waggon, for each respectively, as the purchase prices on delivery, or as the basis on which we agree to let the Waggon upon hire, for a term of _____ years.

We shall also be prepared to furnish two satisfactory sureties, to join with ourselves in a bond, for an amount equal to 10 per cent upon the gross amount of the accepted Tender, conditioned on the due fulfilment of this Contract.

	No. 1.			No. 2.			No. 3.			No. 1.			No. 2.			No. 3.		
	Price per Waggon, with Bowling Tyre and Patent Shaft, or Thornycroft & Co's Axle.			Price per Waggon, with Patent Shaft, Co's Patent Axle, and "B" Tyre.			Price per Waggon, with Thornycroft's Axle, and Patent Charcoal Iron Tyre.			Amount of Rent, per annum, including all charges, and including all charges			Amount of Rent, per annum, including all charges, and including all charges			Amount of Rent, per annum, including all charges, and including all charges		
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PAYMENT.

Payment to be made by the Company, if the Waggon are agreed to be purchased on delivery, within _____ months after date of delivery, and Certificate of their completion, in accordance with the Contract. If agreed for the Waggon to be taken on hire, ~~payment~~ payment of the rent to be made by the Company, every _____ months.

Dated this _____ day of _____ 1857.

Signature.

